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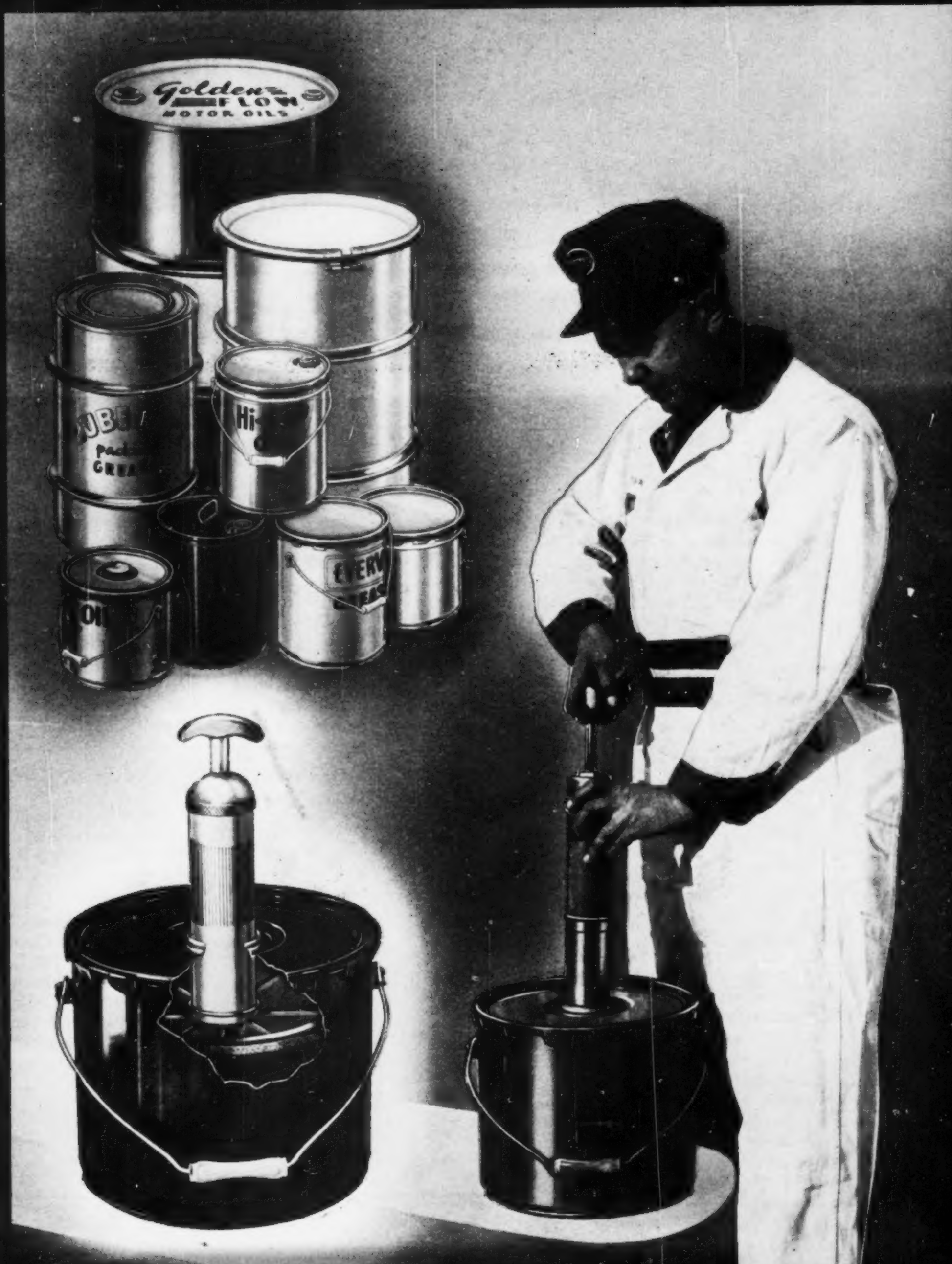

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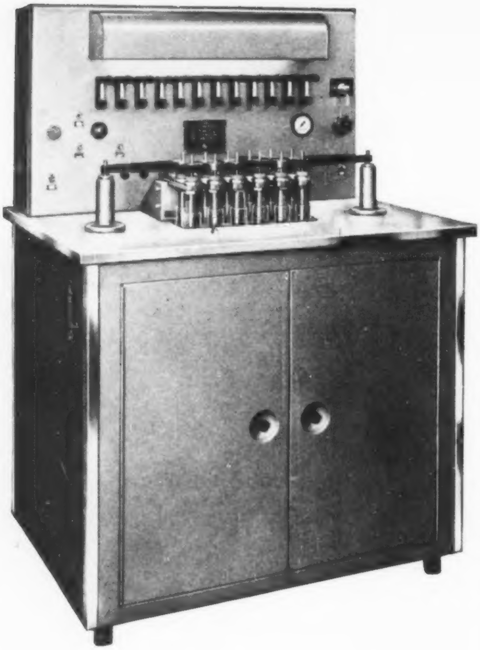

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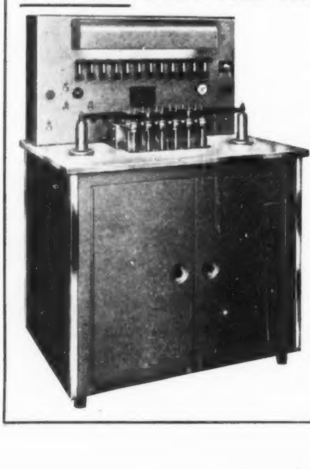

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The INSTITUTE SPOKESMAN

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In This Issue January, 1950

Volume XIII Number 10

ABOUT THE COVER . . .

The Inland "Kleen-Fil" Grease Gun Filler Pail was developed by the Inland Steel Container Company to provide an easier, cleaner, more efficient method of filling grease guns. The acceptability of this type of grease gun filling device to the many users among industrial plants, filling stations, farmers and contractors who do not possess power operated lubricating equipment is a distinct selling advantage to the lubricant manufacturer.

The Inland "Kleen-Fil" Pail is foolproof and trouble-free to operate. The grease gun is simply inserted through the "U-Press-It" opening in the cover of the pail. It fits into the opening in the follower plate, and a slight downward pressure on the gun then releases the plate from the cover. As more pressure is applied and the gun handle is withdrawn, the grease is quickly and uniformly forced into the grease gun barrel. Because of the uniform pressure obtained, the grease packs into the gun solidly. There are no air pockets, which are a frequent source of trouble and annoyance when grease guns are packed by hand.

As the follower plate is depressed, the heavy sponge rubber gasket, which is impervious to grease, sweeps the sides of the pail clean. It adapts itself to any dents in the container wall. Since neither the follower plate nor the cover are removed from the pail until it is empty, the contents receive double protection from dirt and remain clean and free of contamination.

Inland Steel Container Company, 6532 So. Menard Avenue, Chicago 38, Illinois, manufacturer of the "Kleen-Fil" Pail, also manufactures plain grease pails in 25-Lb. and 50-Lb. sizes with either lug covers or with band seal closures. 100-Lb. grease drums are available with a choice of six different types of covers to meet varying requirements. The Inland "Por-Pail" line of containers for liquid lubricants is available in a wide variety of sizes and with different types of pouring spouts. All containers can be lithographed in full color with any trademark or sales message.

President's page

by Arthur J. Daniel, President, N.L.G.I.

At the start of the New Year it is an almost universal custom to pause and look in two directions . . . backward into the past and forward into the future. From my own personal standpoint one of the proudest events of the past year was the confidence which you, the members of the N.L.G.I., expressed by electing me as president of your organization. At this time I again want to express my sincere thanks for this honor. You can be sure that I shall do everything within my power to faithfully fulfill the duties of this office during the coming year. I know I can count on the full cooperation of each member.

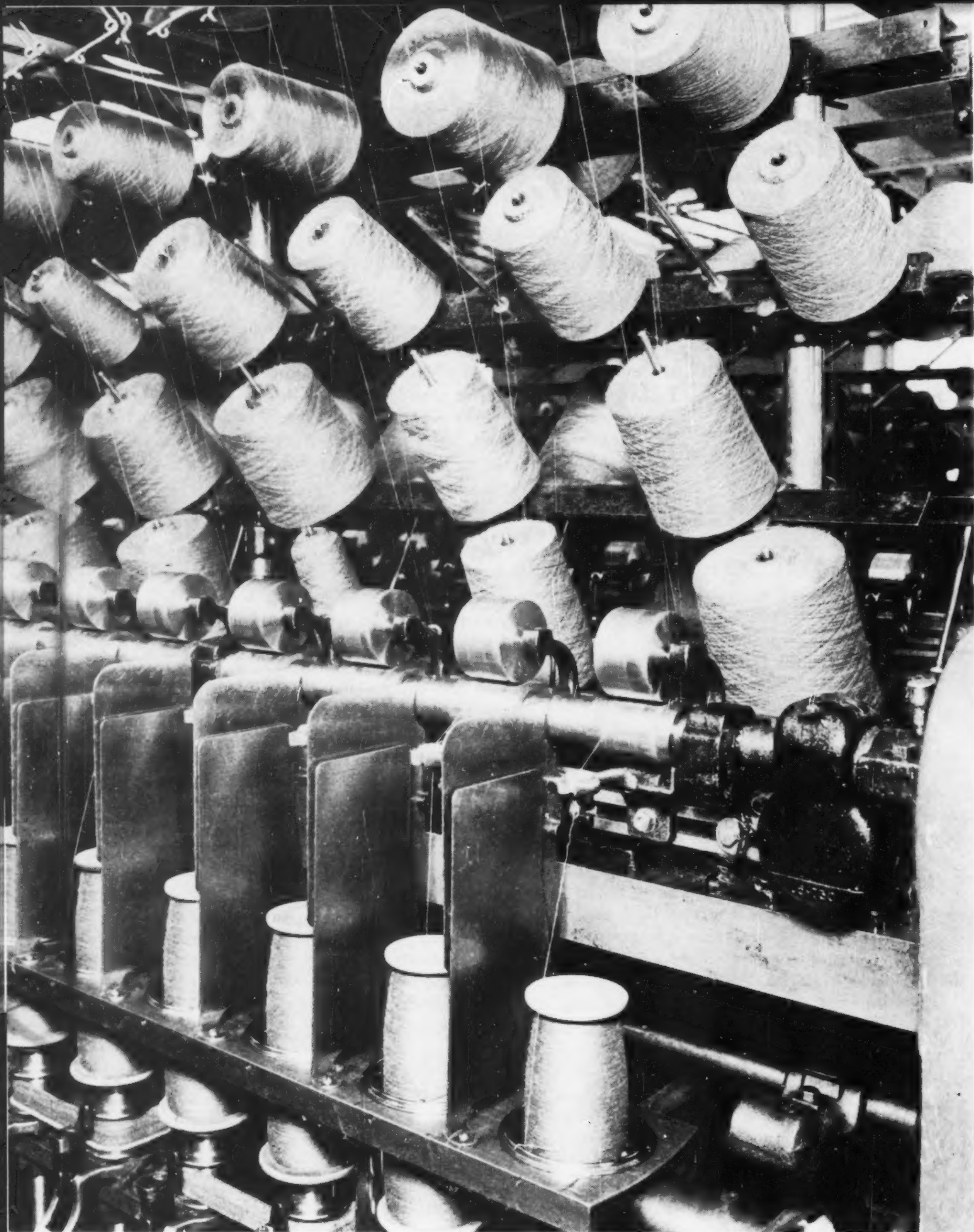
Looking backward for a moment, we can see that the N.L.G.I. was established on a firm foundation . . . the basic need for group action within the industry. For no one man can, in his allotted lifetime, amass into his single brain all of the technical knowledge available regarding the manufacture of lubricating greases. And only through group action in the dissemination of information and interchange of ideas can the individual find the "better solution" to common problems.

Again, the formation of industrial groups such as the N.L.G.I. promotes better acquaintance and understanding, which permits more rapid progress in the work of the various committees . . . and such progress reflects directly to the consuming public through improved lubricating greases and lubrication methods.

But the days that have passed are history . . . it is the future with which we should now be concerned. Today, as never before, there is need for cooperation and understanding between men in the lubrication field. Standing at the threshold of the new Atomic Age, we know that the lubricating grease industry is going to be called upon to perform technological feats that a few years ago would have been called miracles. Through the medium of the N.L.G.I. each man can add his contribution to the efforts of the industry for the benefit of all. For this reason, the N.L.G.I. will continue to grow, both in size of membership and in value to its members.

So, at the threshold of a new year and the new Atomic Age, we each find many opportunities: opportunities for service, opportunities to participate in the general advance of technical and practical knowledge with the betterment of living conditions which will result. By our combined efforts we can make this an eventful and productive year in our industry.

My sincere wish for each member of the N.L.G.I. is that when 1951 rolls around and we again pause in retrospection, you will be able to look back over the experiences and happenings of 1950 and say, "It has been a good year . . . a year of peace, of personal success and of happiness . . . and for the N.L.G.I. it has been a year of continued growth and of worthwhile accomplishments."



Photograph—Whitin Machine Works

"... the forces exerted by the travelers against the ring surfaces are quite large and the job confronting the grease corespondingly severe."

Twister Ring Greases

by

T. G. Roehner, Socony-Vacuum Laboratories, Socony-Vacuum Oil Company, Inc.
E. S. Carmichael, Socony-Vacuum Laboratories, Socony-Vacuum Oil Company, Inc.
F. S. Jones, Lubricating Department, Socony-Vacuum Oil Company, Inc.

From the textile mill operator's viewpoint, twister ring greases are potentially important factors determining the efficiency of his twisting process. To the grease industry, twister ring greases mean a line of highly specialized products. The requirements may vary widely from mill to mill and, further, individual mills may vary their products in accordance with the season or room temperature. Hereinafter, two aspects of this subject will be covered in detail, as indicated below:

(1) Those characteristics of grease which affect their performance in the mill for this particular application.

(2) Laboratory evaluations of twister ring greases with particular attention to a functional tester which appears to have merit not only for assisting development of improved lubricants, but also for guiding recommendations by the grease manufacturer to mill operators.

A review of the information presented in Table 1 will probably be of interest because it will show the wide variations of conditions which exist in present day twisting. These data are necessarily general in nature and some deviations from the values given will be encountered. Both oils and greases are employed as twister ring lubricants. This paper will deal primarily with the latter.

A detailed review of traveler and ring designs will be avoided but it is important to note that there are literally thousands of types and sizes of bronze and steel travelers and many types of rings.[1, 2] The particular combination of traveler and ring for a given operation is selected by the twister after consideration of such factors as properties of the yarn and number of plies twisted, traveler speed, yarn tension, etc. It is seldom realized that in the majority of combinations the forces exerted by the travelers against the ring surfaces are quite large[3] and the job confronting the grease correspondingly severe. In Figure 1 is shown a horizontal traveler, mounted on a ring, and the forces and tensions which actually have been measured for the spinning operation indicated. In the twisting process, a traveler speed may exceed a mile a minute and the centrifugal force of a 100-grain traveler may be greater than 10 pounds.

The rings may be plain or they may be grooved to facilitate retention of sufficient quantity of grease on the ring surfaces between doffs. Three types of grooving are illustrated in Figure 2. So far as applying grease to the rings is concerned, there are two methods. By far the most common practice is to apply a small quantity of grease to the inner ring surface by hand at the end of each doff, but there has

TABLE 1

Approximate Conditions For Twisting

Material	*Lubricant*	*Ring Diameter*	*Ring Depth*	*Spindle Speed, RPM*	*Yarn Size*	*Traveler Metal*	*Traveler Size*
Light Duty Rayon, Silk and Many Synthetic Fibers	Oil (Wick)	4″	3/8″	6000-7000	20-300 denier	Steel	16-32
Rayon Tire Cord Ply	Grease	3½″	1″	5500	1100 denier	Bronze or Steel	12-15
Cable	Grease	5½″	1″	3000	2200 denier	Bronze	6-9
Carpet Yarns	Oil (Wick)	6″	1″	2700	7/8 run	Steel	25-70 grains
Light Duty Cotton, e.g., Thread Yarn	Grease	2½-4½″	43/64″	5000	32-2	Bronze	No. 16 and higher
Medium Duty Cotton, (Majority of all Cotton Yarns)	Grease	3-3½″	43/64″	6000	16-2	Bronze	No. 12 and higher
Heavy Duty Cotton, e.g., Window Cord and Shoe Thread	Grease	3½-4″	43/64″	5500	12-3	Bronze	No. 8 and higher
Duck Twisting	None	4½″ (No. 7 flange)		5000	80-12	Steel	50 grains
Cotton Tire Cord							
Ply	Grease	3½″	1″	5500	23-5-3	Bronze	No. 5-8
Cable	Grease	5½″	1″	2800	10-4-2	Bronze	No. 5-8

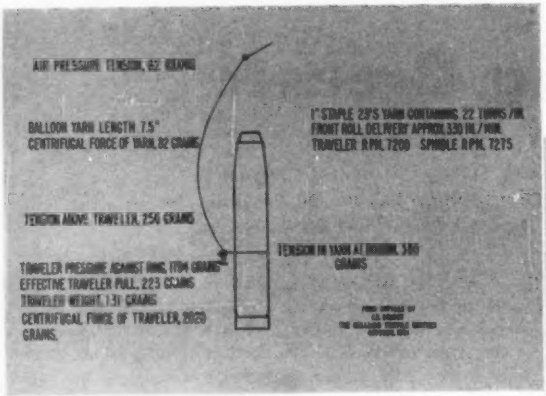


Figure 1.

been a trend during the past few years to explore the possibilities of the use of mechanical lubricators for applying predetermined amounts of grease to the ring surfaces at definite time intervals between doffs. As will be discussed in greater detail later in this paper, excessive traveler wear and brassing of the rings generally results from lack of lubrication, i.e., "dry" running travelers, because of unsatisfactory flow characteristics of grease from the ring grooves under the particular conditions of operation. Whether the use of a mechanical lubricator for this purpose is justified for any given application can generally be resolved by balancing the cost of the equipment and installation against such factors as savings in labor, increased traveler and ring life, lower grease consumption and improved cleanliness of the frames.

The principal types of greases currently used in twisting in this country can be grouped in the following two broad classifications:

I. Light Duty Twisting
   (A) Conventional lime and mixed lime-soda base greases.
   (B) Petrolatums containing small amounts of soda, lime or aluminum soaps.
   (C) Straight petrolatums.

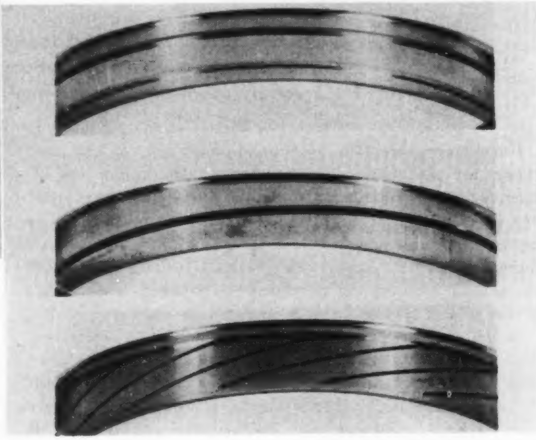
II. Heavy Duty Twisting
   (A) Petrolatums containing soda, lime, or aluminum soaps (higher percentages of soaps than are used in light duty twisting).

The principal characteristics of a grease which should be taken into consideration in selecting a product for a given twisting operation are outlined and discussed below:

1. Flow Properties
2. Chemical Stability
3. Film Strength
4. Ease of Application
5. Color
6. Odor

No attempt will be made in the following sections to review in detail all grease properties, but rather to treat in a general way those characteristics which influence to a marked degree the performance or acceptance of soap thickened lubricants for this application. It will be noted that the above properties are somewhat inter-connected, as for example, ease of application and flow properties.

Figure 2. Conventional Twister Rings Showing Grooving.

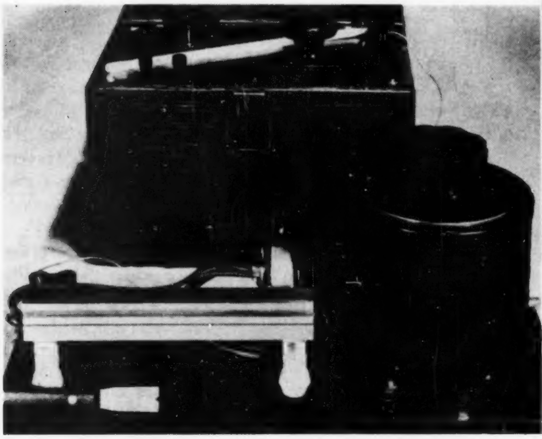


1. FLOW PROPERTIES

This characteristic is one of the most important, particularly when the grease is smeared on the rings by hand. A grease which is too heavy will resist even distribution around the ring by movement of the traveler and some of the smear will be sliced off and flung over the frame. Thereafter, as operating temperatures rise, the product should not flow too readily down the face of the ring or from grooved surfaces as otherwise satisfactory lubrication will occur only during the relatively short period that a sufficient grease film is present. Inadequate flow from the grooves will also lead to difficulties tied in with poor lubrication, such as ends down, deposits, as well as excessive wear. It is necessary, therefore, for the flow characteristics of a given product to be "just about right" for the particular twisting operation, if one application of grease is to last for a complete doff, which may be for a period varying from about one to eight hours.

Numerous screening tests for evaluating flow properties have been employed in the past. Among these tests are the ASTM Dropping Point and Petrolatum Melting Point procedures and simple beaker heat tests for determining in a qualitative way structural and consistency changes in the grease which may occur as the temperature is increased. Generally speaking, dropping point data have to be interpreted with extreme care.[4] Actually, this test provides very limited information that can be used in predicting performance properties under field service conditions. Quite often an experienced technician can obtain more significant information by simply heating the grease with stirring to a tem-

Figure 3. Electrically Heated Grooved Steel Bar.



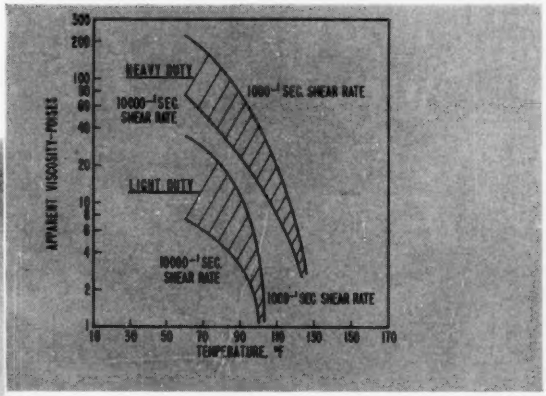


Figure 4.

perature up to, or somewhat above, that to be encountered in service, and observing changes in structure and consistency as the temperature is raised. At best, however, such data are fragmentary in nature and can be employed only for screening out highly unsatisfactory products.

As far as simple heating tests are concerned, it has been our experience that more useful data are obtained by utilizing an electrically heated grooved steel bar, as illustrated in Figure 3. The rectangular steel bar has cross-wise within the upper portion thereof a heating element and thermocouples mounted just beneath the surface of the upper groove. The rate at which the plate is heated is controlled by an autotransformer. The location and size of the grooves and the polished steel surfaces simulate those of a large commercial ring. One of the procedures which has provided data of considerable interest consisting of filling the upper groove with the test grease, applying heat slowly to the simulated ring bearing surface and determining the time and temperature for the grease to flow or slip from the upper to the lower groove.

The data given in Table 2 are examples of the type of information obtained by this method.

TABLE 2

	ASTM Dropping Point °F.	—S/V Flow Point Tester— Flow Point °F.	Upper to Lower Groove Time of Flow Secs.
Grease I.	212	176	227
Grease II.	267	122	55

Based on their ASTM Dropping Points, Grease I should begin to flow from the upper groove before Grease II starts movement. Actually, the reverse occurred. Moreover, with a rise of temperature maintained at 6°F. per minute, Grease II required much less time to reach the lower groove. The practical significance of such variations is still to be determined.

Since the internal frictional characteristics of a grease, i.e., the resistance which two imaginary planes of the lubricant offer to each other with respect to relative motion, are shown by apparent viscosity, the latter property is useful for indicating flow behavior of the lubricant at a given temperature and rate of shear. Apparent viscosity of the grease is of greater importance in twisting than is generally realized. A film of relatively high apparent viscosity on the surface of the ring may cause traveler "drag" and result in excessive yarn tension with an increase in the number of "ends down". As far as initial flow of grease from the ring groove is concerned, the yield value or force required to initiate movement of the product is an important factor. As a matter of probable interest, the apparent viscosity-temperature relationships of a light and heavy duty product over a shear rate range of 1,000-10,000 Sec.$^{-1}$ are shown in Figure 4. As would be expected, the heavy duty grease had a higher apparent viscosity than the light duty grease for given temperature and shear rate values.

Although indicative information regarding probable performance properties of greases for specific twisting applications can be obtained by the above mentioned laboratory tests, there is usually a large gap between those tests and plant evaluations. It is believed that the S/V Functional Twister Ring Grease Tester, which was developed recently, offers considerable promise for narrowing that gap between laboratory and field tests. Results from the field will, of course, be necessary to establish the value of the method, but it is believed likely that functional twister ring evaluations will eliminate from field testing certain of the unsatisfactory products which would otherwise be submitted to the trade on the basis of data obtained by previous procedures.

A photograph of the tester in question is shown in Figure 5. The unit consists of a spindle assembly, without

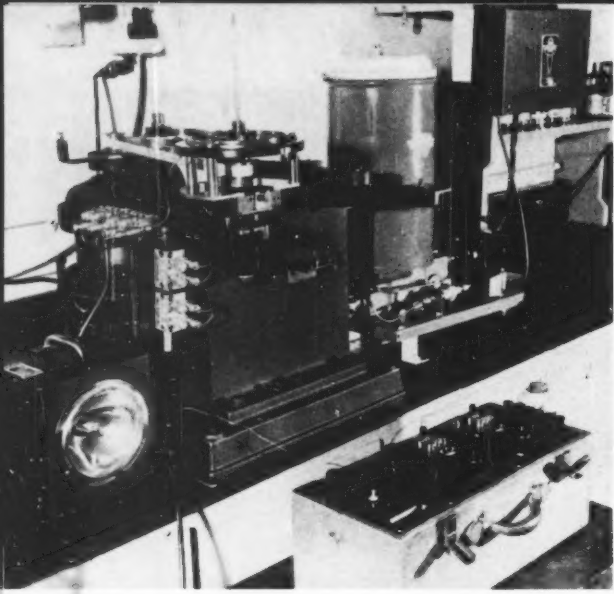


Figure 5. Functional Twister Ring Lubricant Tester.

package, which is mounted on a rigid frame and is driven at the desired speed by a fractional H.P. synchronous motor through a 0.75" herringbone textile tape. The test ring is mounted just above the spindle whorl so as to insure rigidity and reduce vibration. The test traveler is rotated by a pusher arm, secured to a yoke, which in turn is anchored to the spindle. A close-up view of the ring, traveler and pusher arm assembly is shown in Figure 6. The elevation of the pusher arm is adjusted so as to produce essentially the same angular contact of the traveler with the ring as occurs in actual twisting operations.

No attempt will be made to present extensive test data to illustrate the potential usefulness of equipment of this type, but instead, data will be included to show how two products, differing quite widely in structural and flow properties, compare when tested on this equipment under a given set of operating conditions. The conditions selected for these particular tests were actually more severe than those that normally exist in the cable twisting of automobile tire cord. A 5.5" double grooved ring and an 85 grain (5.7 grams) bronze traveler were employed at a spindle speed of 3150 r.p.m. A new traveler was used for each determination.

Two greases, designated Greases A and B, were the test lubricants. Grease A was a conventional lime-soda base grease of an NLGI No. 1 consistency, whereas Grease B was a soda base grease of an NLGI No. 4 consistency containing petrolatum. The characteristics of these two products are given below:

TABLE 3
CHARACTERISTICS OF TWISTER RING GREASES A AND B

Grease	A	B
Type of Soap	Lime-Soda	Soda
Soap Content, %	11.0	4.0
Mineral Oil, %	89.0	96.0*
Characteristics of Mineral Oil:		
Saybolt Visc. @ 100°F.	150"	—
Saybolt Visc. @ 210°F.	44"	65"
Color	Colorless	Amber
Dropping Point (ASTM), °F.	180	145

*Amber Petrolatum

Each of the above two greases was subjected to the following tests:

COMPARATIVE TWISTER RING GREASE TESTS

TEST I

Grooves of ring were filled with grease (total weight = 1.0 gram). No additional grease applied during test. Traveler wear and ring temperature determined periodically during 8 hour run.

TEST II

Grooves of ring were filled with grease. 10 mgs. of grease applied mechanically to ring surface every 30 minutes during 8 hour run.* Traveler wear and ring temperature determined.

TEST III

Grooves of ring were filled with grease. 10 mgs. of grease applied to ring surface every 3 minutes during 8 hour run.* Traveler wear and ring temperature determined.

*Lincoln Engineering Company's Centro-Matic Grease Lubricator with Lube-Unit-Injector.

The data obtained during the above described runs are summarized in Table 4 and are shown graphically in Figures 7 and 8.

TABLE 4
COMPARATIVE FUNCTIONAL TEST DATA
ON
TWISTER RING GREASES A AND B

	GREASE A	GREASE B
TEST I (Hand Lubricated)		
Wear, mgs. after 1 Hour	17	3
Ring Temp. after 1 Hour	157	153
Wear, mgs. after 4 Hours	49	30
Ring Temp. after 4 Hours	155	153
Wear, mgs. after 8 Hours	Excessive wear. Failed after 5.5 hours.	192
Ring Temp. after 8 Hours	—	153
Test II (Mechanically Lubricated—shot every 30 minutes)		
Wear, mgs. after 1 Hour	17	3
Ring Temp. after 1 Hour	147	130
Wear, mgs. after 4 Hours	34	9
Ring Temp. after 4 Hours	151	127
Wear, mgs. after 8 Hours	84	27
Ring Temp. after 8 Hours	156	129
TEST III (Mechanically lubricated — shot every 3 minutes)		
Wear, mgs. after 1 Hour	9	2
Ring Temp. after 1 Hour	155	128
Wear, mgs. after 4 Hours	27	3
Ring Temp. after 4 Hours	155	127
Wear, mgs. after 8 Hours	61	4
Ring Temp. after 8 Hours	156	127

From the results of the above runs, the following comments can be made.

1. Throughout the tests where grease was applied only

to the grooves of the ring at the start of the run, which would simulate hand application in actual practice, it was apparent that Grease A tended to flow too readily onto the face of the ring and, therefore, became depleted before the end of the 8 hour period. This condition occurred in spite of the fact that the dropping point of Grease A was approximately 35°F. higher than that of Grease B. The tendency for Grease A to be drawn readily onto the traveler-ring bearing surface was evident visually from the start of the run. Under these same conditions, Grease B fed at a considerably slower rate and hence consumption thereof was less than that for Grease A.

2. The application of minute quantities of the lubricant periodically, using a mechanical lubricator, greatly reduced traveler wear in both cases. As previously indicated, excessive traveler wear generally results from lack of lubrication, due to the difficulty in obtaining optimum flow properties in the lubricant for a given application.

3. With ample lubricant being supplied mechanically throughout the runs, less traveler wear occurred for Grease B than for Grease A. The data indicated that under the conditions of operation, with or without mechanical application of lubricant, Grease B would be the better of the two products.

4. As would be expected, ring temperatures correlated highly with traveler wear values. It is of interest to note that when Grease B was applied mechanically, instead of by hand only at the start of the run, the average ring temperatures dropped by about 25°F.

In addition to affecting rate of wear and "brassing", the flow properties are a factor in controlling throw-off. If the grease tends to flow too freely, throw-off may become quite excessive. Changes in structure of the grease as it is worked between the traveler and ring may also lead to trouble, particularly if the product is long fibred and "balls up". Some greases, which appear to be short fibred and even buttery as received, may acquire long, tough fibred structures in use and undergo marked changes in flow properties and resistance to throw-off.

2. CHEMICAL STABILITY

The chemical stability of a grease for this application is of importance, because of the severity of the conditions in many of the twisting operations. Highly unstable products chemically will tend to form black residues on the ring surfaces. If throw-off occurs, staining of yarn may result. Furthermore, clogging of the grooves in the rings may become a problem. Although a detailed laboratory method has not as yet been developed for evaluating the chemical stability of a twister ring grease using the above described functional tester, the results of work along this line to-date would indicate that the equipment could be used to advantage for this purpose.

The above mentioned black deposits are usually assumed to be an indication that trouble will be experienced in removing stains on yarn. While the scourability of such spots is less than that of new grease, many tests have shown that the main cause for such difficulty is not the oxidized grease but the metallic components resultant from wear of the rings and travelers.

3. FILM STRENGTH

An improvement in the film strength characteristics of a twister ring grease, as effected through the use of a fatty material or other type of additive, is frequently not demonstrated by actual plant-scale evaluations because of unsatisfactory flow of the lubricant to the bearing surfaces. In other words, excessive traveler wear and ring failure will result, with or without a film strength improving agent present, if a film of grease is not maintained over the face of the ring.

As previously pointed out, most twister ring greases at the present time are essentially dispersions of soaps in

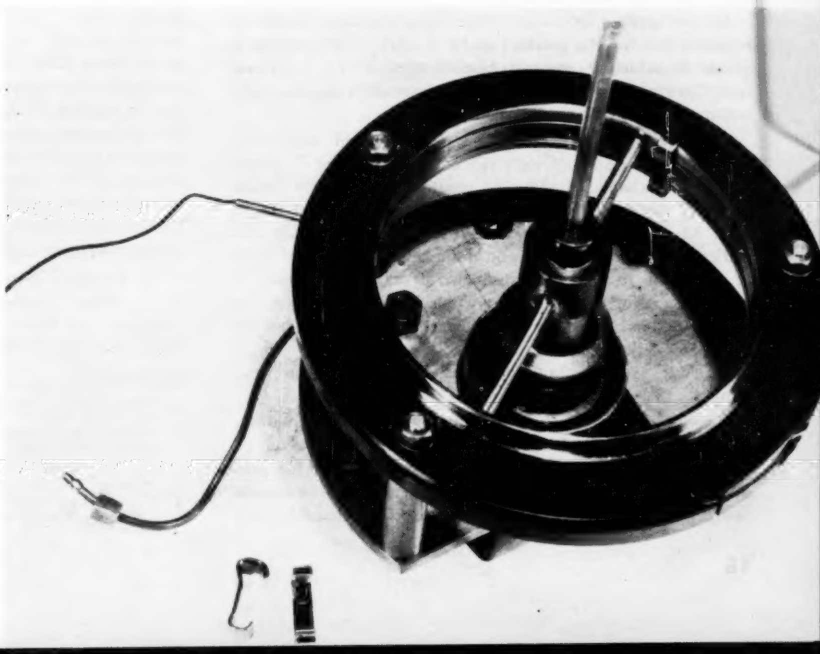


Figure 6. Ring, Traveler and Pusher Arm Assembly.

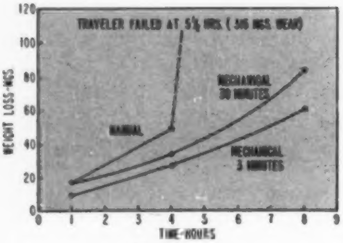


Figure 7.

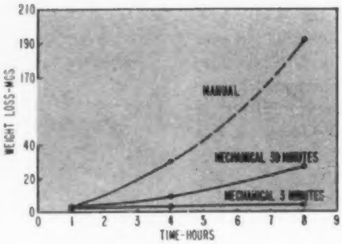


Figure 8.

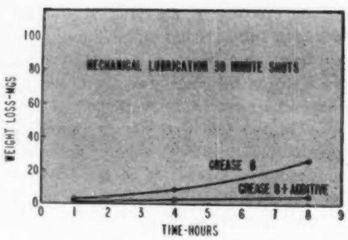


Figure 9.

mineral oils and/or petrolatums. Some products, however, contain small amounts of free fatty material to reduce metal-to-metal contact and hence traveler wear. Practically no so-called extreme pressure greases are currently marketed for this application.

It will be of interest to note the improvement in traveler wear which resulted when tests were carried out in the twister ring grease functional tester using Grease B with and without 5% of a film strength improving material. The same conditions were employed as indicated above, using the mechanical lubricator to apply 10 mgs. of grease to the ring surface every 30 minutes. The data obtained during these runs are given in Table 5.

TABLE 5
BRONZE TRAVELER WEAR DATA
GREASE B WITH AND WITHOUT 5% OF FILM STRENGTH IMPROVING ADDITIVE

	Grease B	Grease B plus 5% Additive
Wear, mgs. after 1 Hour	3	1
Wear, mgs. after 4 Hours	9	3
Wear, mgs. after 8 Hours	27	5

The data in Table 5 indicate that traveler wear can be markedly reduced through the use of the film strength improving additive. See Figure 9.

4. EASE OF APPLICATION

In the application of a twister ring grease by hand, it is preferable for the product to be a smooth, short fibered grease in structure and not heavier than a No. 4 consistency grade. Long fibered greases are difficult to apply without using excessive lubricant.

If the product is applied by a mechanical lubricator, no trouble is generally experienced in dispensing a grease of soft consistency unless it separates oil readily when subjected to pressure and a filtering action. In the latter case, hard residual grease may build up in the lines and orifices of the equipment and retard or prevent the flow of lubricant to the ring surfaces. In this connection, it should be pointed out that some bleeding of the grease is not objectionable. Many consumers of lubricants fail to recognize this fact and erroneously reject greases which have "wet" surfaces and/or which bleed small amounts of oil.

Heavily bodied greases containing petrolatum are at times not readily dispensed in mechanical equipment which is designed for use on twisting frames. In general, if the product is appreciably heavier in body than a No. 4 consistency grade, trouble may be encountered in handling the grease, even though a follower-plate is employed. Regardless of the type of grease used, clogging of screens and small orifices obviously must be avoided by removal of soap lumps and relatively coarse foreign material.

5. COLOR

The color of a twister ring grease is often considered among textile manufacturers as an important characteristic, because it is regarded as connected with objectionable and in many cases costly staining of yarn. Actually, scourability is not always indicated by color. Not many years ago most twister ring greases were prepared from white oils or white petrolatums. Today, however, there would appear to be a trend toward the use of "off white" products because of the savings effected through the use thereof. In most cases the greases are not darker than amber in color, but manufacturers of automobile tire cord have, in some instances, adopted greases prepared from dark green petrolatum.

6. ODOR

An objectionable grease odor, even if slight, will be noticed in the twisting room, particularly if the twisting frames run hot. For this reason, it is highly desirable that a lubricant for this application be essentially odorless.

SUMMARY

A review has been made of certain characteristics of greases which are of importance in connection with satisfactory twister ring lubrication. It has been shown that due to the high degree of specificity in this application, a grease must have flow properties within relatively narrow limits to effect satisfactory results, particularly if the lubricant is applied to the ring by hand. A functional tester for the laboratory evaluation of twister ring greases has been described which appears to have considerable merit. Through the use of this tester, traveler wear data may be obtained to indicate the relative flow and film strength properties of various type twister ring greases.

ACKNOWLEDGEMENTS

We are grateful to Whitinsville Spinning Ring Company, U. S. Ring Traveler Company and Lincoln Engineering Company for their assistance in setting up the functional twister ring grease tester as described in this paper.

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3 Carl D. Brandt, Traveler Weights and Yarn Tensions During Spinning, The Melliand Textile Monthly, Vol. III, No. 7, 1931
4 J. C. Zimmer, Report on Grease Dropping Point Methods, National Lubricating Grease Institute Spokesman, March 1944

GREASONALITIES

RALPH R. MATTHEWS RETIRES

Ralph R. Matthews, Executive Vice President of the Battenfeld Grease and Oil Corporation, retired on December 31, 1949. Mr. and Mrs. Matthews plan to catch up on the traveling they have wanted to do for so long.

In 1928, Mr. Matthews joined Battenfeld's as Vice President in Charge of Sales, after resigning as head of the Lubrication Department of the Shell Oil Company in St. Louis, Missouri.

After graduating from the University of California, Mr. Matthews started his career as a chemist in the Petroleum Division of the U. S. Bureau of Mines. He resigned from that position to become a chemist with the Shell Oil Company at Martinez, California. Later, he became Chief Chemist of the Roxana Petroleum Corporation at Cushing, Oklahoma, moving to the Wood River, Illinois refinery when it was completed. He was promoted to Assistant Superintendent and was Acting Superintendent when the first Dubbs Cracking Plant was built. In 1923, Roxana (later Shell Oil Company) started retail distribution of petroleum products and Mr. Matthews moved to the St. Louis office to head up the Lubrication Department.

Instrumental in the organization of the Division of Petroleum Chemistry of the American Chemical Society which was started in 1921, Mr. Matthews served as chairman for four years. While in the St. Louis area, he was Chairman for two successive terms of the St. Louis section of the American Chemical Society.

For many years, Mr. Matthews has participated in the activities of Committee D-2 of the American Society for Testing Materials. He was one of those who sponsored fuller recognition of lubricating greases by the organization of the Technical Committee "G" on lubricating grease.

Mr. Matthews has been a member of the National Lubricating Grease Institute and the Technical Committee of that organization since it was formed, and has presented several papers at their annual meetings. Also, Mr. Matthews assisted in the organization of a section of the Society of Automotive Engineers and served as Chairman in 1932-1933-1941. He is a member of the Fuels and Lubricants Committee of the Society, and of the Lubrication Committee of the American Petroleum Institute.

JULIUS T. GROENE JOINS SOUTHWEST GREASE

Julius T. Groene, for the past 12 years sales and business manager for Golden Rule Oil Company, Wichita, Kansas has resigned to accept the sales managership of Southwest Grease & Oil Company.

His appointment, effective January 1, will cover supervision of all domestic marketing, according to H. A. Mayor, president of the Wichita manufacturing firm which distributes its products throughout the world.

One of the best known marketers in the mid-continent area, Mr. Groene is past president of the Kansas Oil Men's Association and is at present one of its most active participating directors. He was state chairman of the Oil Industry Information Committee during 1949.

A member of the Golden Rule sales force since 1937, Mr. Groene brings a wealth of know-how and experience in sales and public relations to his new job with Southwest Grease & Oil Company.

He has specialized in the study and practice of lubrication engineering for the past decade and is well qualified in the complex field of lubrication.

ALEMITE'S NEW QUARTER CENTURY CLUB

CHICAGO—Sixteen distributors, charter members of the newly formed "Alemite Distributors' Quarter Century Club," received engraved watches from F. A. Hiter, senior vice president of Stewart-Warner Corporation, at the thirty-third national Alemite convention in Chicago on November 22. The watches were presented "in recognition of 25 years of successful operation and loyal service."

The sixteen represent more than half of the total of twenty-nine distributors who market Alemite products in thirty-four territories throughout the country. Four additional territories are served by factory branches.

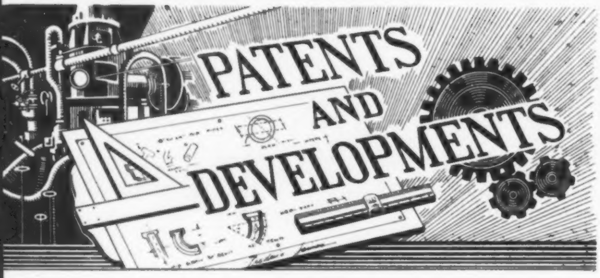
CITIES SERVICE CONSTRUCTS NEW PLANT

Construction of the Cities Service Oil Company's $4,000,000 compound plant at Cicero, Illinois, is 45% complete, according to a company announcement. First blending operations at the plant are scheduled for the middle of 1950.

Located on a 42-acre tract of land on the Illinois Ship Canal near the edge of Chicago, the plant is designed to compound and blend more than 23,000,000 gallons of lube oils per year. Supplemental facilities include a dock on the ship canal for receiving blending stocks, a laboratory, office, garage, boiler plant, storage tanks and a loading dock for both rail and transport facilities.

Blending stocks will be obtained from a solvent-refined lube oil plant, newly-completed at Lake Charles, Louisiana, and barged up the Mississippi and Illinois rivers to the Cicero plant.

The new compound plant is part of Cities Service Oil Company's expansion program for the general Chicago and Great Lakes area which includes modernization of the East Chicago refinery and a technical service laboratory, also at East Chicago.



BLOCK GREASES—A recent patent issued to Standard Oil Company of Indiana describes the preparation of high temperature greases of the driving journal and rod cup types. It is pointed out that these compositions have desirable pressing qualities. In general, the ranges of components employed are approximately as follows: Alkali metal high molecular weight fatty acid soap double chase 30-60% by wt., alkali metal salt of a short chain aliphatic double chase 0.1-10%, alkali metal oil-soluble sulfonate 1.0-20%, glycerin 0.0-2%, and the remainder hydrocarbon oil. Suitable acids for the alkali metal salt of the short chain organic acids are formic acid, acetic acid, hydroxyacetic acid, lactic acid, propionic acid, butyric acid, isobutyric acid, valeric acid, trimethyl acetic acid, caproic acid, hydroxycaproic acid, oxalic acid, malonic acid, succinic acid, methyl malonic acid, tartaric acid, dihydroxy maleic acid, etc. The preferred oil soluble sulfonic acids are those obtained by sulfonation of olefin polymers having at least about 22 carbon atoms in the molecule or those obtained by sulfonation of alkylated aromatics having at least about 19 carbon atoms in the alkyl chain. Acids having combined weights of 350-525 are desired.

The long chain fatty acids employed in preparing the soap stock can be unsaturated, partially unsaturated or saturated fatty acids having 12-22 or more carbon atoms in the chain, such as lauric acid, palmitic acid, stearic acid, oleic acid, cottonseed fatty acid, animal fatty acids, behenic acid, hydrogenated fish fatty acids, or fatty acid pitch. The hydrocarbon oil can be a synthetic or natural hydrocarbon oil, such as a petroleum oil in the viscosity range of 80-300 sec. at 100°F. Say. Univ.

A specific mixture showing good structure and pressability contains 47.5% soda tallow fatty acid soap, 1.0% sodium formate, 6.0% sodium mahogany soap, 45.5% petroleum oil of 200 vis./210°F. This composition has a penetration of 29 at 77°F. and a softening time of 300 (⅛) at 340°F. (85 g. wt.) (U.S. 2,487,080).

In another patent issued to this firm, an alkali metal arylolate is substituted for the alkali metal salt of a short chain aliphatic acid in the composition described in the first-mentioned patent. The arylolate has the general formula T-OM wherein T represents a mono- or polycyclic aromatic nucleus corresponding, for example to phenyl, naphthyl, etc., and M is an alkali metal. Suitable examples are sodium phenolate, sodium cresylate, sodium naphtholate, lithium phenolate, lithium cresylate, etc. However, mixtures are described having both the arylolate and short chain aliphatic acid, e.g. 0.1% sodium formate and 1.0% sodium cresylate. Antioxidants such as naphthol, phenyl alpha napthylamine, etc., and extreme pressure agents, such as halogenated hydrocarbons, mica, graphite, etc. also may be added (U.S. 2,487,081).

LUBRICANTS FOR SHAPING ALUMINUM OR MAGNESIUM ALLOYS—The working of light metals without scoring is facilitated by a composition disclosed in a patent issued to Dow Chemical Company. The particular lubricant employed consists of 50-70 parts by weight of comminuted aluminum having a mesh size of 120-400, 20-30 parts of sodium or potassium palmitate or stearate and 10-20 parts of hydrogenated cottonseed oil, lard oil, or peanut oil. A specific formula given is 65 parts flake aluminum, 25 parts sodium stearate and 10 parts hydrogenated cottonseed oil (U.S. 2,486,130).

LOW TEMPERATURE GREASES—It will be recalled that attention was drawn in the October issue of the SPOKESMAN to certain patents issued to Standard Oil Development Company on the use of carbon blacks, particularly acetylene blacks, as substitutes for soaps in the manufacture of greases. A recent patent issued to this company now discloses that channel black may be made suitable for the production of low temperature greases by first coating the channel black with certain chlorine substituted organic silicon compounds, such as a methyl or ethyl silicon chloride. The coating is applied by placing the black in a long tube equipped with means for agitating or floating the carbon black by blowing an inert gas at a controlled rate into the tube. The other end is equipped with a screen or filter capable of retaining the black while allowing the gas to escape. While the black is thus held in suspension, the silicon compound is distilled into the inert gas stream and allowed to condense on the carbon black particles. Thereafter steam is introduced to hydrolyze the silcon compound.

One example of a composition suitable for the purpose contains the following:

Channel black (Ink black) treated with mixed silicon chlorides	9.0%
Acetylene black	5.0%
Phenyl-alpha-naphthylamine	1.0%
Zinc naphthenate	1.0%
Mineral oil (50 S.S.U. vis. @ 100°F.)	84.0%

The pressure wear index of such a grease is above 15.0, making the material suitable as a low temperature grease. By comparison, a standard non-carbon black lubricant showed an index of less than 6 and a typical lime soap grease specially prepared for low temperature uses showed an index of less than 8 (U.S. 2,487,261).

HEAVY DUTY INDUSTRIAL GREASE—The use of asphaltic products is specified in a patent issued to Lion Oil Company. Semi-solid materials are prepared suitable for use as lubricants on heavy bearing surfaces and gears which operate at comparatively slow speed and as a coating on surfaces to be protected from corrosion. The compounds are prepared by a 2-step process, the first of which involves reducing carefully a residuum without decomposition from a crude oil, to have a flash point, C.O.C. of at least 400°F., but preferably 475° or higher. This material is air-blown at 400°-550°F. in presence of some catalyst which promotes increase in penetration. The blowing is continued until a softening point (R&B) of at least 230° but not over 350° is obtained. A specific ratio of softening point to penetration

is specified. The next step involves blending this air blown asphalt to obtain a dropping point of 75-350 mm/10.

The catalyst may be zinc chloride and copper powder, phosphorus pentoxide, iron chloride, etc. The flux for cutback is preferably a petroleum fraction having at least the boiling point of gas oil, which is used in amounts of 15-70% (U.S. 2,488,293).

GREASES FOR SEVERE CONDITIONS—One Socony-Vacuum Oil Company patent describes a high temperature-high pressure soda grease containing water-dispersible polyvinyl alcohol. These greases containing such reinforcing agent are said to have a high resistance to deformation and bleeding. The use of polyvinyl alcohol for dispersing the soap also may be applied to calcium and other base greases.

In general, these greases will contain the following proportions of ingredients: Fatty material 8.5-48%, alkali 1.5-7.5%, mineral oil 29.5-89.5%, and polyvinyl alcohol 0.5-15%. One specific formula employs a sodium soap content of 10-55%, and about 0.5-6% of polyvinyl alcohol having an average viscosity at 20°C. of 5-100 cp. when in the form of a 4% aqueous solution and a degree of hydrolysis within the range of 50-100% (U.S. 2,487,376).

Another patent (2,487,377) covers a similar composition employing a water-soluble protein as a dispersant. A water-dispersible phenol formaldehyde resin (2,487,378) and a water-dispersible natural gum (2,487,379) are likewise covered.

TESTING HIGH TEMPERATURE PERFORMANCE OF GREASES—The whole December issue of "Lubrication" (issued by The Texas Company), is devoted to the discussion of a method for testing high temperature performance of greases. The machine has the advantage in that, while it is built to operate at 10,000 rpm, with minor changes it can be speeded up to around 30,000 rpm.

ALUMINUM - BASE GREASE—A Canadian patent issued to National Oil Products Company describes a lubricating grease containing 2-20% of an aluminum soap of a saturated higher fatty acid and 0.1-5% of a lithium soap of a higher fatty acid, the quantity of the latter soap being only a fraction of that of the aluminum soap. (Can. 460,765).

A.S.T.M. TO MEET IN PITTSBURG AND ATLANTIC CITY IN 1950

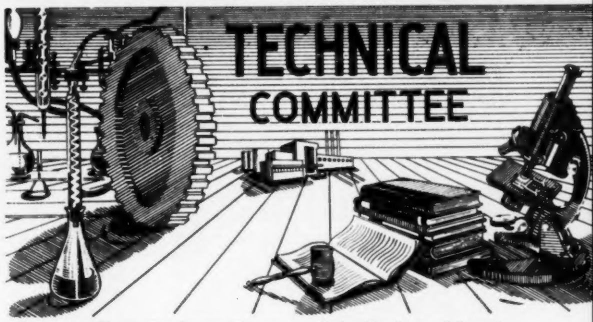
The American Society for Testing Materials will hold national meetings in Pittsburg and Atlantic City in 1950.

The Committee Week and Spring Meeting will be held in Pittsburg, and the 53rd Annual Meeting will be in Atlantic City. The Ninth Exhibit of Testing Apparatus and Related Equipment will be held in conjunction with the 53rd Annual Meeting.

The dates are as follows:

1950 A.S.T.M. Committee Week and Spring Meeting
Hotel William Penn, Pittsburgh, Pennsylvania.
February 27-March 3, inclusive.

1950 A.S.T.M. 53rd Annual Meeting;
Ninth Exhibit of Testing Apparatus and Related Equipment
Chalfonte-Haddon Hall, Atlantic City, New Jersey.
June 26-30, inclusive.



Chairman T. G. Roehner, Director of the Technical Service Department, Socony-Vacuum Laboratories

Due to lack of time at the New Orleans meeting, Mr. Ralph Matthews, of Battenfeld Grease & Oil Corporation, was not given an opportunity to present the following as introductory comments on the broad subject of "Non-Soap Lubricating Greases."

"Quite a few years ago, Committee D-2 of the American Society for Testing Materials adopted the following definition of a lubricating grease: '. . . a combination of a petroleum product and a soap, or a mixture of soaps suitable for certain types of lubrication'.

"While gear lubricants do not actually come within that definition, they have always been associated with lubricating greases. This is probably a holdover from the days when transmissions and differentials of automobiles were lubricated with a gear compound which was made, generally, with a sodium, or combination of sodium and calcium soaps. Then, too, lubricating greases have been accepted as under that classification which are residual petroleum products and oils which have been densified to a grease consistency with a filler such as air-floated asbestos or other densifying products. Other lubricating greases are now being manufactured and used which contain silicon fluids, fluorine compounds, and esters.

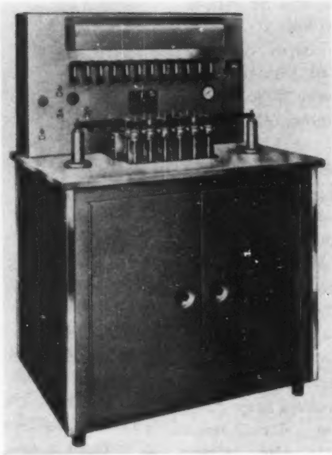
"At this meeting of N.L.G.I. in New Orleans, a very interesting paper was presented on Bentones which if properly compounded with lubricating oils produced lubricating greases which are satisfactory for many purposes. During the same meeting, the Joseph Dixon Crucible Company passed out information regarding a densifying compound for producing lubricating greases which they had developed. This is a very interesting development and may lead to a simplification of the manufacture of lubricating greases except for special applications. It will also mean that Committee D-2 of the American Society for Testing Materials will have to revise the definition which has been set up for lubricating greases."

Mr. Matthews' remarks certainly indicate the need for a more up-to-date definition for lubricating greases. It is proposed that this problem be presented to the Technical Committee to determine what they regard as satisfactory and this Technical Column can be utilized as one medium for exchanging ideas and opinions on the subject. Contributions should be sent to either Mr. Harry F. Bennetts or your Chairman.

Incidentally, the above remarks also indicate that research on lubricating greases is showing some interesting dividends which may eventually have a far-reaching effect on the industry.

"PRECISION" SOHIO POLY-VERIFORM LUBRICANT TESTER

Precision Scientific Company, in cooperation with the Standard Oil Company of Ohio, has developed an apparatus for studying the corrosion characteristics, oxidation stability, and the varnish and sludge formation tendencies of lubricating oils. Ten-hour tests on the Poly-Veriform correlate satisfactorily with the 36-hour L4 Cheverolet Test (A.S.T.M.). In contrast to the L4 Test, which tests one oil at a time, the Poly-Veriform will evaluate 12 samples at once, and is easily cleaned in a short time—two features offering wide possibilities in new test work.



The Poly-Veriform can be used to study the effect of experimental variations in additive composition, the effect of additive concentration in a base oil, the additive response in different types of base oils and the effect of corrosion inhibitors in combination with corrosive detergent-type additives. The apparatus can also be used as a quality control instrument for plant batches of commercial motor oil.

In operation, a highly polished test piece of bearing metal is weighed and placed in 100 grams of oil sample. A hardened steel drill rod weighing about 600 grams is placed on the bearing metal to approximate the thrust load on a bearing. The entire set-up is heated to and held at 325°F. The drill rod is then rotated at 625 r.p.m. while air is bubbled through the oil sample at 70 liters per hour. Before and after the Poly-Veriform test, the usual tests for pentane - insolubles, benzine - solubles, viscosity changes, neutralization and saponification are made on the sample oil. The bearing metal piece is weighed after the test to evaluate the degree of corrosion.

The Poly-Veriform Lubricant Tester is a complete and self-contained unit that may be transported to and operated in any part of the laboratory. Its 12-unit cast aluminum bath is electrically heated and thermostatically controlled. The 12-units can be operated at once or in banks of 6 units; each bank is driven by ¼ h.p. motor. The air flow to each unit is controlled by flowmeters and needle valves mounted on the instrument panel. Traps are provided for cleaning and drying the air. A fluorescent light illuminates the instrument panel. The body is attractively finished in Green Hammerloid; the table top is clad in gleaming stainless steel. Overall dimensions: 42" high, 30" deep, 60" high.

MALLINCKRODT DEVELOPS A NEW ALUMINUM STEARATE

The Mallinckrodt Chemical Works has announced the addition of Aluminum Stearate Technical D-50 to its line of metallic soaps, developed primarily for use in the lubricating grease industry.

Soap costs may be reduced as much as 50% through the use of D-50 and therefore this new grade should be of interest to all industries using aluminum stearates as gelling agents.

Laboratory and field trials with a variety of oils and operating conditions indicate that at low soap concentrations it possesses good resistance to mechanical breakdown upon working and has high dropping points, even texture and resistance to bleed.

A new booklet, "Aluminum Soaps for Lubricating Grease Manufacture" is also being presented by Mallinckrodt. It contains descriptions of their major gel-forming aluminum stearates together with comprehensive discussions of good manufacturing techniques, the advantages of using combinations of aluminum soaps, an improved method for the laboratory evaluation of greases, common grease-plant troubles and their remedies and some important factors which can affect grease manufacture. Copies of this informative booklet and samples of Aluminum Stearate Technical D-50 may be obtained from the Company.

HIGH CONSISTENCY ROTATIONAL VISCOMETER

The High Consistency Rotational Viscometer was developed in cooperation with The Texas Company to measure the viscosity of asphalt and related viscous substances. It is said to make it possible a complete evaluation of high consistency materials having complex flow characteristics. When testing high consistency liquids, it supposedly determines viscosity, the degree of flow complexity and the relative elasticity. The Viscometer was designed primarily for testing roofing, paving and waterproofing products but is also suitable for testing viscous paints, varnishes, adhesives and plastics.

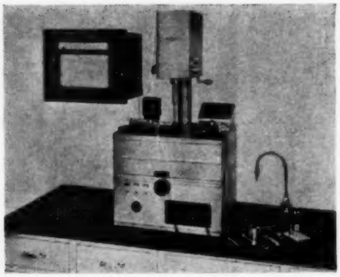
The High Consistency Rotational Viscometer measures and records viscosity from 0.001 to 1,000 megapoises at various rates of shear. The sample cup can be rotated at any one of ten speeds from 0.0696 to 2200 revolutions per hour and these speeds are in direct relation to the rate of shear. Speeds can be changed by shifting a lever on the front panel.

The torque, resulting from the viscous drag of the sample on a stator immersed in the sample cup, is re-

SUPPLIERS OF MATERIALS FOR MANUFACTURING LUBRICATING GREASES

MISCELLANEOUS

MANUFACTURERS OF EQUIPMENT FOR APPLICATION OF LUBRICATING GREASES



corded by a Brown "ElectroniK" recorder through a Statham strain gauge. To condition the samples, the Viscometer has a constant temperature bath with a range from 20°C to 100°C. It is claimed the temperature is controlled within 0.1°C. by a Rapid-Set Thermo-Regulator in conjunction with a Merc-to-Merc relay. The bath is provided with a coil for refrigerant if low temperatures are needed.

The Viscometer housing is of polished stainless steel with a Bakelite top. The top has provision for pre-heating four samples while a fifth is being tested.

NEW JOYCE SEMI-HYDRAULIC SINGLE POST LIFT

The new Joyce semi-hydraulic lift is available with drive-on superstructure for quick oil changes and lubrication work, or free wheel superstructure for efficient tire, brake, wheel and lubrication service. Rated capacity 8,000 lbs., rise 58", speed approximately 30 seconds, finish—Toluidine red and Jet black. Standard equipment includes appropriate superstructure, jacking unit, (piston assembly) and air operating valve.

The same jacking unit used in the Joyce full hydraulic lifts is used in this semi-hydraulic lift. When oil level becomes too low for safe operation, a magnesium float traveling at oil level in the perforated tube automatically seats in the low level valve. This prevents air from entering jacking unit. A newly developed seal around the air line insures that all oil will pass through the low level valve. The size of this opening is engineered to properly control the speed of the lift in both raising and lowering.

WHAT DO YOU KNOW ABOUT SPERM OIL?

COMPOSITION Sperm Whale Oil is unique among all of the fatty oils. It is actually a liquid wax, being composed of about 65% normal higher monohydric alcohol esters and 35% of the glycerol esters.

COLOR Sperm Oil ranges from a pale yellow to an almost water white.

VISCOSITY Sperm Oil has an unusually flat viscosity index curve. At increased temperatures or pressures, Sperm Oil is affected much less than other fatty oils.

REACTIVITY Sperm Oil combines readily with chemical reagents. When reacted at fairly high temperatures, it bodys very little. Nor will it become gummy as do animal and vegetable oils.

OXIDATION Sperm Oil is non-drying. It will not turn rancid or oxidize under prolonged exposures to the air.

SPECIFIC GRAVITY Sperm Oil's specific gravity is lower than that of the glyceride type oils. About .883 for the Natural oil, and .925 for the bodied.

SOLUBILITY Sperm Oil is miscible with most organic solvents, except alcohol. Alcohol-miscible Sperm Oil can be furnished, however.

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45° Bleached Winter	0.25	132-138	80-90	100-115	32-35	44-46° F	500-510° F
38° Natural Winter	2.00	132-138	80-90	100-115	32-35	44-46° F	500-510° F
38° Bleached Winter	0.25	132-138	80-90	100-115	32-35	44-46° F	500-510° F
Bodied	8.50	170-180	48-54	290-310	30-35	45-50° F	500-510° F

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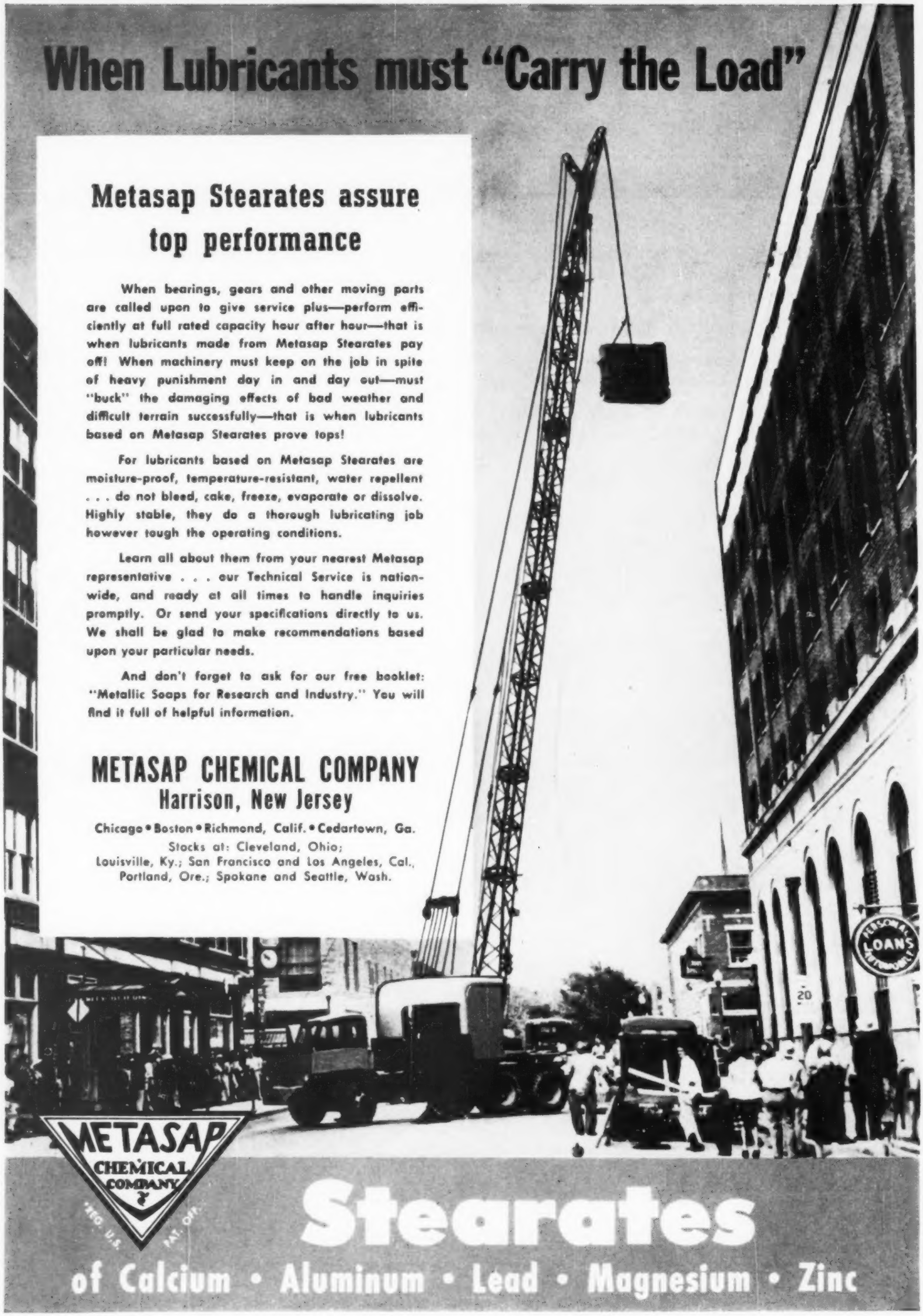
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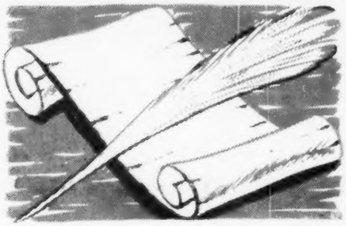

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National Lead Company
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Division of the Sun Chemical Corporation
10-10 44th Avenue
Long Island City 1, New York
Member—Dr. J. J. Whitfield

The Werner G. Smith Co.
(Division of Archer-Daniels-Midland Co.)
2191 West 110th Street
Cleveland 2, Ohio
Member—F. C. Haas

Witco Chemical Co.
75 E. Wacker Drive
Chicago, Illinois
Member—B. W. Lewis

CONTAINER MANUFACTURERS

Central Can Company, Inc.
2415 West 19th Street
Chicago, Illinois
Member—Henry Frazin

Continental Can Co.
1103 Waldheim Building
Kansas City 6, Missouri
Member—N. M. Potts

Geuder, Paeschke & Frey Co.
324 North Fifteenth Street
Milwaukee 3, Wisconsin
Member—Willard J. Flint

Inland Steel Container Company
6532 South Menard Avenue
Chicago 38, Illinois
Member—J. T. Gossett

J & L Steel Barrel Company
70 East 45th Street
New York City, New York
Member—Jerry Lyons

United States Steel Products Co.
30 Rockefeller Plaza
New York City 20, New York
Member—Wm. I. Hanrahan

Vulcan Stamping & Manufacturing Co.
300 Madison Street
Bellwood, Illinois
Member—Dale M. Harpold

MANUFACTURERS OF EQUIPMENT FOR APPLICATION OF LUBRICATING GREASES

The Aro Equipment Corporation
Byron, Ohio
Member—R. W. Morrison

Balcrank, Inc.
Disney near Marburg
Cincinnati 9, Ohio
Member—R. P. Field

Gray Company, Inc.
60 11th Avenue Northeast
Minneapolis 13, Minnesota
Member—L. L. Gray

Lincoln Engineering Company
5730 Natural Bridge Avenue
St. Louis, Missouri
Member—Foster Holmes

National Sales, Inc.
812 North Main Street
Wichita, Kansas

Stewart-Warner Corp.
1826-1852 Diversey Parkway
Chicago, Illinois
Member—Walter Duncan

U. S. Air Compressor Company
5300 Harvard
Cleveland, Ohio
Member—C. A. Benning

LABORATORY EQUIPMENT AND SUPPLIES

Precision Scientific Company
3737 Cortland Street
Chicago 47, Illinois
Member—Alexander I. Newman

SUPPLIERS OF EQUIPMENT FOR MANUFACTURING LUBRICATING GREASES

Buflovak Equipment Division of Blaw-Knox Company
1543 Fillmore Avenue
Buffalo 15, New York
Member—A. W. Johnson

The Girdler Corp.
Louisville 1, Kentucky
Member—John E. Slaughter, Jr.

Stratford Engineering Corporation
1414 Dierks Building
Kansas City, Missouri
Member—J. A. Altshuler

REFINERS

Calumet Refining Company
4323 Southwestern Blvd.
Chicago, Illinois
Member—H. E. Semerau

Mid-Continent Petroleum Corporation
Tulsa, Oklahoma
Member—T. E. Fitzgerald

TECHNICAL AND RESEARCH ORGANIZATIONS

Cargill, Incorporated
200 Grain Exchange
Minneapolis 15, Minnesota
Member—Dr. Sabine Hirsch

Mellon Institute of Industrial Research
University of Pittsburgh
Pittsburgh 13, Pennsylvania
Member—Malcolm Finlayson

Midwest Research Institute
4049 Pennsylvania
Kansas City 2, Missouri